Annual Index of Articles: 1991

AGGREGATES

Plastic Aggregate: Using colorful plastics instead of mineral aggregates produces striking design effects. Although plastic aggregates cost more than mineral aggregates, they are lighter in weight and make use of recycled plastics. More testing of long-term performance needs to be done. **2 pp; 91:399**

ARCHITECTURAL CONCRETE

A Contractor's 10 Commandments for Architectural Concrete: Humorous but helpful list of tips for building with architectural concrete. **1 p; 91:620**

Weathering of Concrete: Concrete weathers over time from rainwater, dirt deposits, organic growths, and staining caused by reactive aggregates and metal. Learn how architectural details can reduce these effects. **6 pp; 91:44**

BACKFILLING

Backfilling Basics: You must protect the wall during backfilling, choose the right backfill material, compact the backfill, and finish to the correct grade. **3 pp; 91:315**

Controlled Low-strength Material: Describes how CLSM, or flowable fill, has advantages over the regular soil backfill used. Also can be used in road repairs as a subbase. **6 pp; 91:389**

BRIDGES

Bridge Spans Lifted 80 Feet From Barge: Working from a barge in Narragansett Bay, contractors lifted 2,400-ton precast bridge spans into position on the Jamestown-Verrazano Bridge in Rhode Island. **3 pp; 91:465**

Concrete Bridges on the Historic Columbia River Highway: Samuel Hill, a wealthy Portland, OR, entrepreneur, and Samuel Lancaster, an engineer and road builder, built the Columbia River Scenic Highway through the Columbia River Gorge in the early 20th century. **6 pp; 91:66**

New Construction Method for Arch Bridges: Tubular steel arches filled with concrete act as falsework and structure—called the CLCA method (concrete lapping with pre-erected composite arch). Details construction of two bridges in Japan. **3 pp; 91:9**

Short-span, Rigid-frame Bridge: The entrance bridge to Pelican Bay Subdivision, Collier County, FL, is made of 18 precast rigid frame units, erected on their precast footings in a single day. Architectural precast railings and other decorative details complete the elegant bridge. **2 pp; 91:352**

CANOES

Concrete Canoe Racing: Twenty university teams competed in the Fourth Annual Concrete Canoe Competition. Tells how the canoes were designed, tested, and built. **3 pp; 91:678**

COATINGS

Coat Concrete Floors Fast: Describes a self-propelled machine that applies liquid coatings at rates up to 2,500 square feet per minute. **2 pp; 91:190**

Protecting Concrete From Exposure to Aggressive Chemicals: Select a coating or lining based on chemical exposure, compatibility with the substrate, application conditions, and type of exposure. Describes epoxies, polyesters and vinyl esters, phenolics, and furans. **3 pp; 91:541**

COMPUTERS

Customize Every Concrete Batch With Computers: Computerized mix management system varies proportions to meet varying needs instead of just relying on fixed batch weights; describes software currently in testing for ready mix plants. **3 pp; 91:477**

Software Solutions for Concrete Pumping Companies: Two dedicated pumping software packages are available. Compares features. **3 pp; 91:481**

Why You Need a Computer—and How to Develop a Successful System: Computers improve your company's appearance, speed, quality, and efficiency. Buying one requires committing enough money, getting the right amount of power and customer service for your needs, finding the proper software, and getting enough training. **4 pp; 91:473**

CONSOLIDATION

Consolidating Concrete the Right Way: Gives 10 rules for correctly using an internal vibrator. **2 pp; 91:676**

CORROSION

Combating Corrosion in Both New and Existing Parking Garages: Contractor uses cathodic protection in the existing garage and silica-fume concrete in the new one. **4 pp; 91:527**

Electrochemical Process Stops Rebar Corrosion: Externally applied system draws chloride ions out of concrete while

restoring alkalinity. Describes how to install system and what actually occurs. **3 pp; 91:181**

FLOORS

Concrete Screed Rails Used for Concrete Placed on Metal Decks: Leave-in-place screed rails permit the use of vibrating truss-type screed for concrete consolidation without requiring form stripping. **2 pp; 91:341**

Construction of Elevated Concrete Slabs, Part II: Covers practice and procedures of constructing elevated slabs, from preplanning to mix design to finishing to F-numbers. **7 pp; 91:32 (Part I appeared in November 1990, p. 910)**

Construction of Elevated Concrete Slabs, Part III: Covers measuring floor flatness and levelness, how to achieve flat, level floors, dealing with camber and deflection, and making sure elevation and thickness are correct. **6 pp; 91:260**

FORMWORK

Aluminum Wall Forms Speed Pour Down for High-rise: Contractor Fletcher Pacific Construction achieved 4-day cycles for the 44-story Nauru Tower in Honolulu using a construction sequence similar to that of tunnel form systems. The slabs plus walls and columns for the level below are poured at the same time, working from the deck form surface. But the wall and deck forms are separate, joined by a unique hinge that permits the wall forms to be stripped separately from the deck forms. **4 pp; 91:818**

Bracing for Wall Formwork: Covers bracing requirements and design and how wind load varies, and gives an example for 10-foot-high wall forms. **3 pp; 91:545**

Choosing Support Members for Wall and Deck Forms: Careful selection of support members can help ensure proper form alignment and prevent deflection. Describes lumber and engineered wood, aluminum, and steel products. Includes sections on adjustable horizontal shores and determining loads. **5 pp; 91:811**

Concrete Sphere Houses French Planetarium: A 66-foot-diameter concrete sphere houses the planetarium for a technical school in Montpellier, France. Using a modular forming system permitted workers to place and vibrate concrete continuously. The fully self-supporting formwork required no bolts or ties. **3 pp; 91:25**

Forklift-moved Forms Simplify Parking Garage Construction: Describes how concrete contractor C. D. Smith built a Milwaukee parking garage using forms that could be moved by forklift instead of cranes. **3 pp; 91:469**

Introducing Controlled Permeability Formwork: This formwork increases concrete durability in the critical cover zone, improves surface appearance, and reduces form pressures. The formwork is permeable to air and water but not to cement particles. The system comprises a filter, drain, and structural support. Used in Japan and the United Kingdom, it's still in its infancy. **3 pp; 91:198**

Room Tunnel Forming: A Day in the Life... : Efficient use of tunnel forming technology often means repeating a construction cycle every 24 hours. **3 pp; 91:791**

Thin-shell Concrete Dome Built Economically With Rotating Forming and Shoring System: Spanning 270 feet, the thin-shell concrete dome topping the Sundome stadium in Yakima, WA, has 24 wedge-shaped segments arranged in a radial pattern. Only six wood forms were needed to cast the 24 segments because of an innovative rotating forming and shoring system. **3 pp; 91:490**

12-tank Concrete Water Treatment Plant Answers St. Louis Water Purification Needs: Winter concreting and efficient formwork cycling help St. Louis contractor complete project on schedule. **2 pp; 91:405**

Vaulted Concrete Roof Demands Custom-built Forms: Arched fiberglass joist forms with thickened centers eliminate the need for structural ties on Shiley Eye Center at the University of California San Diego. **3 pp; 91:655**

FOUNDATIONS

Mat Foundation and Post-tensioned Frame Solve Site Problems: Construction of the Bourse Garage and theater complex in Philadelphia was limited by narrow streets, limited onsite access, a high water table, and the need to fit in visually. **2 pp; 91:740**

Underpinning Job Unearths Unexpected Problems: Excavating by hand and many small pours were needed to create a basement from a crawlspace beneath a 70-year-old school. **3 pp; 91:603**

Underpinning Systems for Settled Foundations: Piers driven to bearing strata stabilize settlement and also can be used to lift settled structures. Describes how different systems work. **4 pp; 91:321**

GROOVING PAVEMENTS

Grooved Bridge Decks Are Safer Bridge Decks: Compares grooving versus tining and tells how to groove bridge decks. **3 pp; 91:683**

HIGH-RISE CONSTRUCTION

High-rise Apartment Framed in Concrete: Four high-rise apartment buildings were planned on the Detroit River. The first two were built of structural steel, but the last two were made with a concrete frame because of its many advantages. Details construction. **5 pp; 91:783**

Self-propelled Aerial Work Platforms Solve Overhead Access Problems: Telescopic and telescopic articulated booms have excellent reach capabilities for construction sites. Compares reach capabilities and describes operating and safety features. **5 pp; 91:334**

HISTORY

Concrete Was Big in Seguin, Texas: In the 1850s, numerous concrete structures and homes were built in Seguin, TX. Details construction and rehabilitation of Sebastopol State Historic Site. **2 pp; 91:204**

Oldest Concrete Pavement Celebrates 100 Years: The oldest concrete pavement in the United States is in Bellefontaine, OH. In October, the city celebrated its 100 years of service. **1 p; 91:745**

The Parthenon: An Exact Replica of the Famous Greek Temple: Nashville's best-kept concrete secret is its replica of Athens' Parthenon. Built at the turn of the century in Nashville, TN, this replica of Athens' Parthenon uses concrete that imitates the marble of the original. Describes construction. **5 pp; 91:411**

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JOINTS

Avoid Joint Deterioration in Concrete Parking Structures: Describes control, construction, and isolation joints and how to choose the right sealant. Covers maintenance and repair. **3 pp; 91:616**

Vacuum Blasting Cleans Expansion Joints Without Dust: Contractor turns to vacuum blasting technique after having problems with other cleaning methods such as sandblasting and wet blasting. Sandblasting created too much dust for passing motorists and water blasting took too long to dry joints. **2 pp; 91:194**

LANDSCAPING

Making Concrete Waterscapes: Many photos show how California contractor Ken Macaire uses custom carving to create regionally accurate concrete waterscapes for residential and commercial use. **1 p; 91:480**

LISTS

Concrete Construction *Subject Index: 1990:* Listing of 1990 articles in *Concrete Construction* by subject. **13 pp; 91:118**

Concrete Construction *Article Index: 1991:* Listing of 1991 articles in *Concrete Construction* with description. **5 pp; 91:1004**

Directory of Specialized Concrete Evaluation and Testing Services: Lists names, addresses, and telephone numbers of firms that provide specialized evaluation or testing services to the concrete industry. Each entry is coded to refer to its specialties. **14 pp; 91:278**

MANAGEMENT

Advice From 50 Years Ago Still Applies: Portland Cement Association advises inspectors how to work with contractors, workers, and visitors to the site. **1 p; 91:88**

Buy, Lease, or Rent?: Compare the real costs of buying, leasing, and renting equipment. Gives an example and discusses the alternative minimum tax, residual value risks, purchase options, and maintenance costs. **3 pp; 91:80**

Collecting What You're Owed With Mechanics Liens: When you've built improvements to someone else's property and you haven't been paid, you can use a mechanics lien to collect your money. Gives tips on using liens. **2 pp; 91:84**

Daily Reports Repay the Effort to Keep Them Current: Learn how to log daily jobsite activities and how it will save you money in the long run. **3 pp; 91:688**

MARINE ENVIRONMENT

Designing Concrete for Exposure to Seawater: Low permeability is critical to concrete mix designs for concrete that is under seawater or exposed to it in splash zones or subject to salt spray. Covers water-cement ratio, admixtures, and other ingredients. **3 pp; 91:813**

MARKETING

Contractors Play Key Roles in Expanding Tilt-up Construction: Strong marketing efforts can ensure further growth. Tells history of tilt-up and projects its future. **3 pp; 91:420**

How to Protect Your Residential Concrete Investment: Gives homeowners recommendations for ensuring their residential concrete will last. Contractors can reprint this article for their customers. Talks about keeping water away from foundations and not using deicers on pavements. **1 p; 91:738**

Introducing Tilt-up into a New Market: Tells author's strategies for promoting tilt-up in Australia. **3 pp; 91:250**

Promoting Concrete Parking Lots and Streets: Promote concrete by educating the buyers and selling them based on their interests. Charts the interests of various groups. **3 pp; 91:725**

Support Needed to Preserve Concrete Paving Market: Mechanistic pavement design, as used in Illinois, can be misinterpreted, causing concrete to lose a share of the paving market. **2 pp; 91:746**

MATERIAL HANDLING

Concrete Placement for Small Pours: Use chutes, a mixer-mounted conveyor, a portable conveyor, a motorized buggy, or a small-line concrete pump. **3 pp; 91:599**

Conveyor System Speeds RCC Dam Construction: A conveyor system delivered the RCC mix for the Cuchillo Negro Dam in Arizona from the mixing plant to the dam site. Precast panels acted as upstream formwork against which RCC was placed. **3 pp; 91:831**

MIX DESIGN

Concrete Mix Design: Outlines the steps needed to proportion concrete that meets job requirements. Covers ACI 211.1 standard practice and how to make mix adjustments and trial batches. **2 pp; 91:62**

NOTABLE STRUCTURES

The Eastern Scheldt Storm Surge Barrier: The Netherlands built and designed a surge barrier with closable gates to hold back the North Sea and keep estuaries environmentally in balance at the same time. **3 pp; 91:385**

White Sails on Bennelong Point: The Sydney Opera House: The peaceful beauty of the architecture indicates little of the chaotic years of its construction. **3 pp; 91:13**

A Concrete Lotus in India: Describes how the Baha'i Temple in India was constructed. **3 pp; 91:17**

OVERLAYS

Overlaying Concrete Bridge Decks With Polymer Concrete: Describes surface preparation and proper mixing and placing techniques for polymer concrete bridge deck overlays. **6 pp; 91:325**

PATTERN STAMPING

Imprinted Concrete Accents Elegant Home: The Langford home in Frontenac, MO, has imprinted concrete, simulating rough-cut limestone, for its sidewalks and patios. **1 p; 91:736**

Pattern Rolling Instead of Stamping?: A patterned cylinder can be rolled across concrete with a bull float handle to make an imprinted surface that's less expensive to build than pattern stamping. **3 pp; 91:177**

PAVING

Concrete Path Paver Eliminates the Need for Formwork: Towed by a ready

mix truck, slipform paver can pave up to 3,500 lineal feet per day. Ideal for sidewalks and bike and golf trails. **2 pp; 91:186**

Downsized Pavers: Describes the differences among curb and gutter paving machines, multipurpose machines, and the big slipformers. **3 pp; 91:721**

Nomograph Allows Quick Estimates of Concrete Volumes for Slabs: Use this nomograph to estimate the volume of concrete needed for slabs of varying thickness and area. Joseph Deigh, a retired civil engineer, devised it so contractors could determine concrete volumes without complicated formulas. It also can be used to find the slab area for a particular volume of concrete poured at a specified thickness. **1 p; 91:500**

Power Screed on Skis Speeds Concrete Paving Job: Laser-controlled hydraulic ski attachments of this power screed ride on the subbase and hold screed at the desired elevation. **2 pp; 91:350**

Reusable Steel Side Forms for Paving: Steel side forms can do smaller jobs that slipformers aren't economical for. Gives sizes and costs and markets. Describes installation and advantages over wood forms. **3 pp; 91:730**

Trans-Canada Highway Intersections Receive Concrete Facelift: Medicine Hat, AB, Canada, used 139,935 square feet of concrete pavement to restore asphalt intersections—the largest use of concrete for this type of installation. **2 pp: 91:733**

PROBLEM CLINIC

January (3 pp; 91:76)

- How soon to place wall and column concrete on top of footings and slabs?

February (2 pp; 91:208)

- Circular cracks probably caused by overloading
- Cap cylinders before curing them?

March (1 p; 91:275)

- Removing footprints on a floor
- Clumps of dry material in ready mix discharge

April (3 pp; 91:346)

- How a half cell detects corrosion
- Sources of colorful aggregates for concrete

May (2 pp; 91:426)

- Height limits on concrete free fall
- Yield problems and waste allowance

June (2 pp; 91:498)

- Discolored driveway slab
- Explaining aggregate tests
- Adding water to concrete at the jobsite

July (1 p; 91:556)

- Alternatives to using Type V cement
- Condensation causes slippery sidewalk

August (3 pp; 91:625)

- Thawing frozen subgrades
- Sources for Georgia buggies
- Should whitetopping have uniform thickness?

September (1 p; 91:691)

- Waste allowance isn't meant to compensate for low yield
- Quality requirements for curing water

October (5 pp; 91:748)

- Causes and solutions for slab discoloration
- Long-strip construction preferred for slabs on ground
- Recommended depth for control joints

November (1 p; 91:838)

- Formless footings permitted?
- How many concrete control tests are needed on an average job?
- More information about aggregate tests
- Time limit between pours to avoid cold joints
- Difference between Type I and III cements

December (1 p; 91:883)

- Effect of crazing on long-term floor durability
- Waterproofing concrete storm shelter
- How do you know if the maximum permissible water-cement ratio is exceeded?

PUMPING

Concrete Producers Who Also Pump Concrete: Pumping can be a separate profit center but also offers hidden benefits. Describes ready mix producers' experiences with pumping. **3 pp; 91:607**

Concrete Pumps, Traveling Forms Speed Construction of Twin-arch Tunnel: Huge highway tunnel project in Canada has 35 double-barreled segments, each about 68 feet long, 49 feet wide, and 16 feet high. **2 pp; 91:592**

Consider All Costs When Choosing a Concrete Placing Method: Using a placing boom can be profitable even with two tower cranes on a job. **2 pp; 91:595**

Long-boom Pumps Help Keep Sewage Treatment Plant Construction on Schedule: Requiring 135,000 cubic yards of concrete, the Oceanside Water Pollution Control Plant spreads over 12 acres of Pacific Ocean front, west of San Francisco. Building concrete foundations, walls, and slabs for the structures requires multiple pours with long-boom pumps nearly every working day. **2 pp; 91:383**

Ocean-side Foundation Mat Pour Presents Challenges: Dewatering and soil stabilization were needed to prepare the site for a three-story building only 10 feet from the Pacific Ocean. Placement crews then completed a 16-hour overnight mat pour requiring 7,400 cubic yards of concrete with five pumps. None of the pumps had to be moved during the pour and the fast-track schedule was met with hours to spare. **2 pp; 91:669**

Record-setting Waffle Slab Tops Underground Convention Center Wing: Ten-foot-square waffle units and 90-foot column spacings accommodate exhibit space needs for San Francisco's Moscone Center. Describes construction and post-tensioning. **2 pp; 91:827**

What Makes Concrete Pumpable?: These excerpts from the second edition of

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Pumping Concrete: Techniques and Applications tell how to avoid blockages and how coarse and fine aggregate properties affect concrete pumpability. **4 pp; 91:834**

REPAIR

Cathodic Protection Also Protects Costs: Life-cycle costs show cathodic protection costs less than other repairs for a Rhode Island parking garage. **2 pp; 91:534**

Post-tensioned Reservoir Roof Replaced: Engineers developed an ingenious column support system (a grid of concrete beams, resembling an egg crate) that reduced soil pressure under the column footings and distributed loads for a new reservoir roof in Greeley, CO. **4 pp; 91:861**

Rehabilitating Ohio State's Stadium: Concrete repair involved removing loose concrete, abrasive blasting of stained areas, and patching with a color-matched latex-modified patching material. Exposed steel was painted with an alkyd zinc-dust primer before patching. All surfaces were then sealed with a silane-siloxane sealer. **3 pp; 91:484**

Repair and Retrofit Using External Post-tensioning: There's an alternative to the steel-beam, concrete topping, and tear-down-and-start-over methods of building repair and retrofit. Pioneered by a California engineering/construction firm, the external post-tensioning (EPT) method has been successfully applied to repair or retrofit some 30 concrete and steel structures in the United States. Describes one site. **4 pp; 91:536**

SAFETY

Get Tough on Safety Before the Government Gets Tough on You: Condenses a presentation by ASCC executive vice president W. Burr Bennett, Jr., at a WOC '91 safety seminar. Urges contractors to get serious about safety. **3 pp; 91:551**

Mechanics of a Trench Collapse: A trench is an unnatural condition. Drawings show why trenches are so dangerous. **4 pp; 91:270**

OSHA Increases Penalties Sevenfold: Now that OSHA's fines have increased sevenfold, it pays to improve jobsite safety. Explains new fines. **2 pp; 91:493**

Repetitive-motion Injuries: A Growing Employee Health Issue: Describes how to reduce risk of job-related repetitive-motion injuries. **3 pp; 91:90**

SAWING

New Saw Blade Permits One-pass Joint Sawing: Saw blade patented by a sawing contractor lowers costs by reducing sawing time needed; green cut (crack inducing) and wider, shallower reservoir cut are made at the same time. **2 pp; 91:343**

SCULPTURE

Irish Artist Sculpts With Concrete: Katy Goodhue of Dublin, Ireland, sculpts concrete because she finds it versatile and economical. **2 pp; 91:623**

Abstract Form *Cast in Concrete:* Describes how Lynn Olson made this sculpture. **3 pp; 91:212**

SHOTCRETE

Developments in Shotcrete for Repairs and Rehabilitation: Details shotcreting advancements in materials technology; batching, mixing, and supplying methods; and application methods. **5 pp; 91:659**

SOIL CEMENT

Cement-stabilized Alluvium Protects Embankments from Erosion: A soil cement using river bed soil instead of sandy, fine-grained material was used to channelize the Rio Salado in Tempe, AZ. **3 pp; 91:672**

TESTING

Testing for Chloride Permeability of Concrete: The rapid chloride permeability test is an alternative to ponding tests. Describes how test is run and how contractors can help or hinder its accuracy in the field. **3 pp; 91:531**

TILT-UP

Planning a Tilt-up Project: Before tilt-up work begins, consider lifting inserts, wind braces, compressive strength, and panel size, weight, thickness, elevations, and embed elevations. **3 pp; 91:869**

Tilt-up and Trompe l'Oeil: A Perfect Match: Many pictures show trompe l'oeil done on tilt-up buildings. **2 pp; 91:247**

Tilt-up in Seismically Active Areas: Tilt-up withstands earthquakes well. Describes roof and floor connections. **4 pp; 91:611**

Tilt-up Under the Big Top: Describes how contractor Larry Clark uses huge tents to keep work going through winter on his tilt-up buildings. **2 pp; 91:257**

Under Fire: A fire in a Phoenix building proves that tilt-up walls can remain standing when the roof burns down. **3 pp; 91:253**

TOPPINGS

Tipping Floors Require Tough Toppings: After collection, solid waste is dumped on concrete tipping floors at facilities such as incinerators or transfer stations. Metallic toppings are needed on these floors to protect them from the constant scraping of bulldozers and front end loaders. **3 pp; 91:407**

TRADE SHOWS

WOC Heads for Atlanta After Record-setting Las Vegas Show: World of Concrete '91 had 36,300 show-goers and 947 exhibitors in 335,550 net square feet. **2 pp; 91:496**

UNDERWATER CONCRETE

Advances in Underwater Concrete Repair Methods: With antiwashout admixtures it's no ' nger necessary to maintain a continuous tremie seal. Covers practices and admixtures used to place concrete under water. **3 pp; 91:665**

WALL PANELS

Welded Wire Sandwich Panels Shotcreted: Habitat for Humanity built 14 homes in 14 days just outside of Miami using 4x8-foot wall panels made of expanded modified polystyrene sandwiched into lightweight three-dimensional steel truss and faced with welded wire fabric reinforcement. Dry-mix shotcrete was applied to the inside and outside surfaces. **2 p; 91:878**

WHITETOPPING

Colorado Tests Whitetopping for Asphalt Road Rehabilitation: Describes fast-tracked whitetopping test projects in Colorado—how they were built and resulting pavement. After initial evaluation, pavement had no major defects; minor ones are listed and described. Says the cost of concrete per square yard is about the same as asphalt when it comes to large-scale whitetopping projects such as interstate highways. **3 pp; 91:56**